California Public Utilities Commission Workshop
2:45 PM May 11, 2015
Calculating MAOP When There Are Insufficient Records To Comply With Federal Regulations – What Is The Process For Moving Towards Compliance?

US DOT PHMSA Office of Pipeline Safety

When There Are Insufficient Records To Comply With Federal Regulations

- Subpart L–Operations
  - §192.603 General provisions.
  - (a) No person may operate a segment of pipeline unless it is operated in accordance with this subpart.

Examples of Records Violations

1. No records to substantiate the established MAOP. This could include not having records of an uprate or class location changes.
2. Not all applicable elements required in a MAOP calculation were adequately documented.
3. Records are inconsistent with field observations.

Options for what to do next

- Reduce operating pressure to account for unknown values.
- Investigate the unknown items according to the principles that underlie the proposed Integrity Verification Process.
- Seek a Special Permit or Waiver from the Regulatory Authority.

In short, work with the authority having jurisdiction to develop a plan for compliance.

The priority, as always, is to ensure the safe operation of the pipeline.

Few Records – Path Forward

- PHMSA has worked with States and individual Operators on developing material verification plans for specific pipelines and systems (both transmission and distribution) to ensure the safe operation of the pipeline. Examples include:
- State Findings have been supported – Indiana
  Special Permit for IURC Cause Number 44342; PHMSA 2013-0247
- Waivers have been published – Maine
  Maine PUC Docket No. 2011-00360; PHMSA 2013-0243
- Plans have been published – Magellan Longhorn
  PHMSA-2012-0175, Chapter 9, Section 9.3.3.3.1
- www.regulations.gov , enter PHMSA Docket #

Waiver issued by Indiana - excerpt

PHMSA-2013-0247

Dear Mr. Allen:

The Pipeline and Hazardous Materials Safety Administration (PHMSA) reviewed your letter of October 30, 2013, providing notification that the State of Indiana Utility Regulatory Commission (IURC) intends to issue a state waiver to the City of Huntingburg, Indiana Municipal Gas Utility (Huntingburg – IURC Cause #44342), contingent upon PHMSA's approval. The waiver allows the 4-inch steel distribution pipeline to operate at a maximum allowable operating pressure (MAOP) of 200 pounds per square inch (psi) until a verifiable MAOP can be determined. In order to determine a verifiable MAOP, the operator needs to conduct pipe excavations to determine wall thickness to comply with 49 CFR § 192.619(a)(1) and a pressure test to meet the requirements of § 192.619(a)(2) and 170 IAC 5-2-2(7).

The 4-inch pipeline consists of approximately 8.4 miles of pipe originating at a purchase meter station with Midwest Gas Transmission Company near Stendal, Pike County, Indiana and ending at a pressure reducing station near the intersection of County Road 750 South and County Road 500 West in Dubois County, Indiana.

The City of Huntingburg requested this waiver to operate the pipeline segment at 200 psi until a verifiable MAOP can be established. PHMSA does not object to the waiver to operate the pipeline segment up to 200 psi. The MAOP determination for design pressure (including confirmation of material properties) and pressure test prior to raising the pressure above 200 psi should be performed and compliance demonstrated in accordance with §§ 192.619(a)(1), 192.619(a)(2), and 170 IAC 5-2-2(7). The requirements of § 192.619(a)(1) for the confirmation of design pressure and § 192.619(a)(2) for a pressure test are as noted below:

Waiver issued by Maine - excerpt

Re: Docket No. PHMSA-2013-0243

Dear Mr. Kenny:

The Pipeline and Hazardous Materials Safety Administration (PHMSA) has reviewed your letter of October 21, 2013, providing notification that the Maine Public Utilities Commission (MPUC) issued a State waiver to Northern Utilities, Inc. d/b/a Unitil (Unitil – MPUC Docket No. 2011-00360) contingent upon PHMSA's approval. The MPUC waiver (MPUC Docket No. 2011-00360) grant allows various diameters (½ through 12-inches) of steel (coated and bare) and plastic distribution pipelines to operate at a maximum allowable operating pressure (MAOP) determined through alternative evaluation measures. MAOP determination must be conducted by Unitil to meet the requirements of §§ 192.619(a)(1), 192.619(a)(2), 192.621(a)(1) and provisions of Chapter 420 of MPUC Rules.

Unitil's waiver request to the MPUC consists of MAOP determination deficiencies in 40 distribution systems (40 distribution segments in Unitil gas distribution system) in the State of Maine. The systems consist of various pipe diameters (½ through 12-inches), approximately 384 miles of pipe, and MAOPs from 30 pounds per square inch (psi) to 500 psi as described in Attachment A– dated 03-20-2014 (enclosed).

Unitil requested this waiver from the MPUC to:

Records: what do we need?

- Material records – pipe, fittings & fabrications, etc.
  - Standards – API, ASME, ANSI, MSS, and ASTM
  - Tests – mechanical & chemical properties, welding, NDE, and hydrostatic test
  - QA and QC
- Design and Construction records
- Hydrostatic Pressure test records
- Operations and Maintenance records
- Integrity Management records

"Records" in a Code Section Title

Records are the fundamental basis for many justifications and decisions made under Part 192.

- 192.491 Corrosion control records.
- 192.517 Records. *(in SubPart J)*
- 192.947 What records must an operator keep?
- 192.1011 What records must an operator keep?

Records in other Significant Places

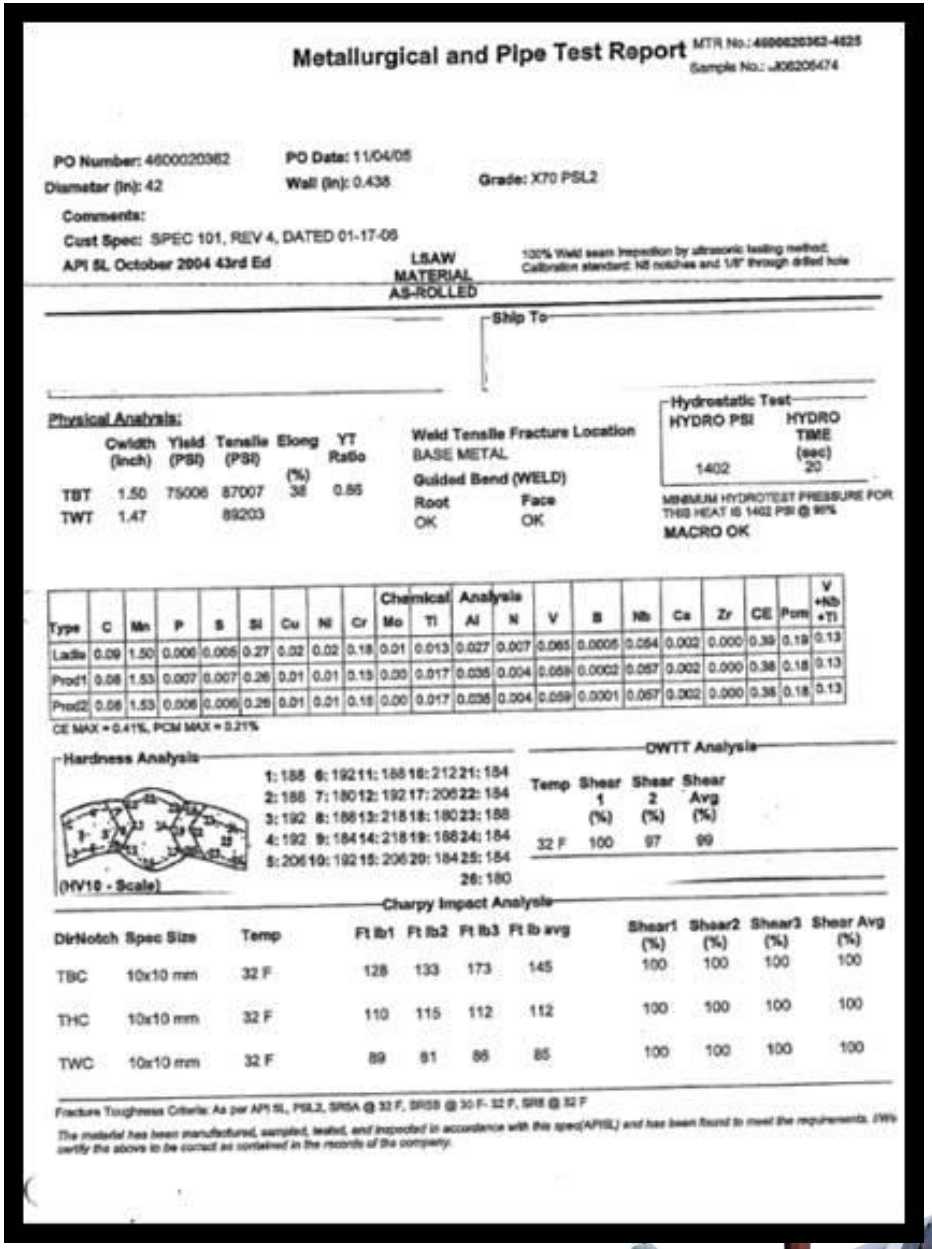
- §192.553 General requirements… (b) Records. Each operator who uprates a segment of pipeline shall retain for the life of the segment a record of each investigation required by this subpart, of all work performed, and of each pressure test conducted, in connection with the uprating.
- §192.603 General provisions… (b) Each operator shall keep records necessary to administer the procedures established under §192.605.

Material and Pipe Records

- Materials must be manufactured in accordance:
  - DOT referenced standards
  - Able to maintain structural integrity of the pipeline:
    - Operating pressure, temperature, and environmental conditions including outside force loads
- API 5L – pipe mill test report
  - Chemical properties
  - Tensile properties – yield and ultimate
  - Hydrostatic test pressure

MTR – Pipe

- Mill Test Reports



Metallurgical and Pipe Test Report

MTR No.: 4600620363-4625
Sample No.: J06206474

PO Number: 4600020362 PO Date: 11/04/05
Diameter (in): 42 Wall (in): 0.438 Grade: X70 PSL2
Comments:
Cust Spec: SPEC 101, REV 4, DATED 01-17-05
API 5L October 2004 43rd Ed
LSAW
MATERIAL
AS-ROLLED
100% Weld seam inspection by ultrasonic testing method.
Calibration standard: N8 notches and 1/8" through drilled hole

Ship To

Physical Analysis:

	Cwidth (inch)	Yield (PSI)	Tensile (PSI)	Elong (%)	YT Ratio
TBT	1.50	75006	87007	38	0.86
TWT	1.47		89203		

Weld Tensile Fracture Location
BASE METAL
Guided Bend (WELD)
Root OK
Face OK

Hydrostatic Test
HYDRO PSI: 1402
HYDRO TIME (sec): 20
MINIMUM HYDROTEST PRESSURE FOR THIS HEAT IS 1402 PSI @ 90%
MACRO OK

Chemical Analysis

Type	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Ti	Al	N	V	B	Nb	Ca	Zr	CE	Pcm	V +Nb +Ti
Ladle	0.09	1.50	0.006	0.005	0.27	0.02	0.02	0.18	0.01	0.013	0.027	0.007	0.065	0.0005	0.054	0.002	0.000	0.39	0.19	0.13
Prod1	0.08	1.53	0.007	0.007	0.26	0.01	0.01	0.13	0.00	0.017	0.035	0.004	0.059	0.0002	0.057	0.002	0.000	0.38	0.18	0.13
Prod2	0.08	1.53	0.006	0.006	0.26	0.01	0.01	0.18	0.00	0.017	0.036	0.004	0.059	0.0001	0.057	0.002	0.000	0.38	0.18	0.13

CE MAX = 0.41%, PCM MAX = 0.21%

Hardness Analysis

(HV10 - Scale)

1: 188 6: 192 11: 188 16: 212 21: 184
2: 188 7: 180 12: 192 17: 206 22: 184
3: 192 8: 186 13: 218 18: 180 23: 188
4: 192 9: 184 14: 218 19: 186 24: 184
5: 206 10: 192 15: 206 29: 184 25: 184
26: 180

DWTT Analysis

Temp	Shear 1 (%)	Shear 2 (%)	Shear Avg (%)
32 F	100	97	99

Charpy Impact Analysis

DirNotch	Spec Size	Temp	Ft lb1	Ft lb2	Ft lb3	Ft lb avg	Shear1 (%)	Shear2 (%)	Shear3 (%)	Shear Avg (%)
TBC	10x10 mm	32 F	128	133	173	145	100	100	100	100
THC	10x10 mm	32 F	110	115	112	112	100	100	100	100
TWC	10x10 mm	32 F	89	91	86	85	100	100	100	100

Fracture Toughness Criteria: As per API 5L, PSL2, SR5A @ 32 F, SR5B @ 30 F- 32 F, SR6 @ 32 F

The material has been manufactured, sampled, tested, and inspected in accordance with this spec(API5L) and has been found to meet the requirements. We certify the above to be correct as contained in the records of the company.

Subpart C–Pipe Design

- 192.105 Design formula for steel pipe.
- 192.107 Yield strength (S) for steel pipe.
- 192.109 Nominal wall thickness (t) for steel pipe.
- 192.111 Design factor (F) for steel pipe.
- 192.113 Longitudinal joint factor (E) for steel pipe.
- 192.115 Temperature derating factor (T) for steel pipe.
- 192.121 Design of plastic pipe.
- 192.123 Design limitations for plastic pipe.

Records Management

What type of pipe records are needed?

- For Design Formula and MAOP:
  - Outside diameter
  - Pipe wall thickness
  - Yield strength
  - Weld joint/seam type
- Pipe Design
  - Withstand external pressures and anticipated loads
  - Designed for service and class location

Subpart J–Test Requirements

- 192.501 Scope.
- 192.503 General requirements.
- 192.505 Strength test requirements for steel pipeline to operate at a hoop stress of 30 percent or more of SMYS.
- 192.507 Test requirements for pipelines to operate at a hoop stress less than 30 percent of SMYS and above 100 psig.
- 192.509 Test requirements for pipelines to operate below 100 psig.
- 192.511 Test requirements for service lines.
- 192.513 Test requirements for plastic pipelines.
- 192.515 Environmental protection and safety requirements.
- 192.517 Records.

Subpart L–Operations

- 192.609 Change in class location: Required study.
- 192.611 Change in class location: Confirmation or revision of maximum allowable operating pressure.
- 192.619 Maximum allowable operating pressure: Steel or plastic pipe-lines.
- 192.621 Maximum allowable operating pressure: High-pressure distribution systems.
- 192.623 Maximum and minimum allowable operating pressure: Low-pressure distribution systems.

NTSB Recommendations following San Bruno

- Delete grandfather clause
- Require all pre-1970 gas transmission pipelines be subjected to hydrostatic pressure test incorporating spike test

Pipe – 30-inch Seamless?

Why are pipeline material records needed?

In addition to the existing records requirements in Part 192, Section 23 of the PSA of 2011 requires PHMSA to:

- Direct gas transmission Operators to provide verification their records accurately reflect MAOP of Class 3 and 4 locations and Class 1 and 2 HCAs
- Reconfirm MAOP for pipe with incomplete records
- Strength test all untested pipe in HCA operating at > 30% SMYS

Gas Transmission NPRM – coming soon

- Integrity Verification Process is being used to address the Grandfather Clause topic from the ANPRM published in 2011.
- PHMSA intends to publish an Appendix which will list records and retention requirements in an easy-to-use format.
- Public Workshop on Integrity Verification Process on August 07, 2013 (Mtg #91)
  - http://primis.phmsa.dot.gov/meetings/MtgHome.mtg?mtg=91

Integrity Verification

Integrity Verification Process (IVP) is based on 4 principles:

- Apply to higher risk locations (High Consequence Areas (HCAs) and Moderate Consequence Areas (MCAs))
- Screen segments for categories of concern (e.g., "Grandfathered" segments)
- Assure adequate material and documentation
- Perform assessments to establish MAOP

IVP Principles

#1: Apply to Higher Risk Locations

- High Consequence Areas (HCAs)
- Moderate Consequence Area (MCA):
  - Non-HCA pipe Class 1 locations that are populated in PIR (proposed 1 house or occupied site) to align with INGAA commitment
  - House count and occupied site definition same as HCA, except for 1 house or 1 person at a site (instead of 20)

IVP Principles

#2: Screen for Categories of Concern

- **Apply process to pipeline segments with:**
  - Grandfathered Pipe
  - Lack of Records to Substantiate MAOP
  - Lack of Adequate Pressure Test
  - Operating pressures over 72% SMYS (pre-Code)
  - History of Failures Attributable to M&C Defects

IVP Principles

#3: Know & Document Pipe Material

- If Missing or Inadequate Validated Traceable Material Documentation, then establish material properties by an approved process:
  - Cut out and Test Pipe Samples (Code approved process)
  - *In Situ* Non-Destructive Testing (if validated and Code approved)
  - Field verification of code stamp for components such as valves, flanges, and fabrications
  - Other verifications

IVP Principles

#4: Assessments to Establish MAOP

- Allow Operator to Select Best Option to Establish MAOP
- Candidate IVP Options for Establishing MAOP
  - Subpart J Test with Spike Test
  - Derate pressure
  - Engineering Critical Assessment
  - Replace
  - Other or new technology

Questions and Answers?